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also rather crude, but later becoming more and more refined, until finally it has become almost if not quite metaphysical. To Professor Greil, however, preformationism in any of its forms is a stone of stumbling and a rock of offense, and in the two volumes now before us he attempts to recall the feet of the faithful to the paths of epigenesis, by what he terms, with insistence, a formal or descriptive analysis of the phenomena of development.

He starts, however, with a basic proposition, "the true and fundamental principle of rational comparative embryology," which he expresses in the words of Haeckel, "Aus Gleichartigem Ungleichartiges." He is thus an epigenesist of the epigenesists and his method of analysis is to proceed from this assumed truth to reconstruction of the embryological history. The first part of the treatise is practically a reprint of a paper recently published in the *Zoologische Jahrbücher*¹ and is a description of the phenomena of development as seen by a thorough-going epigenesist, who is also a firm believer in the biogenetic law. In the second part special problems, such as adaptation and variability, inheritance and sex-determination, are similarly surveyed and in a somewhat extended appendix the various theories of Roux, R. Hertwig, Rabl, Mehnert, Kassawitz, Fick and Godlewski are reviewed and criticized, with the same richness of dialectic that pervades the entire work.

For the author wields the pen of a ready writer, which unfortunately frequently leads him into unnecessary repetitions and verbosity, which extend over seven hundred pages what might have been clearly and forcibly presented in perhaps half the space, to the greater comfort and satisfaction of the reader. But even with due allowance for redundancies, the ground covered is so extensive as to preclude the possibility of a review or even a bare enumeration of the various questions discussed, and it must suffice to repeat that the main thesis of the work is the all-sufficiency

¹ A. Greil, "Ueber allgemeine Richtlinien des Entwicklungs- und Vererbungsprobleme," *Zool. Jahrb.*, Bd. XXXI., Abt. für allgem. Zool. und Physiol. der Tiere, 1912.

of epigenesis. That is the one and only power, and formal analysis is its prophet. Professor Greil presents a strong case, but it must be confessed that he does not and, indeed, in the present state of our knowledge, he can not yet remove the difficulty that has forced so many thinking zoologists into preformationism, namely, an explanation of how differentiation is possible by epigenesis. One may glibly talk of cellular interaction, of effects produced by quantity and quality of the food and by the outside environment, and of the determination resulting for the chemical constitution of the ovum, but until we have concrete evidence of how these or other factors act in the production of differentiation epigenesis will continue to be no explanation. And, after all, if the last named of the above factors be admitted, is it not merely carrying preformationism back to its ultimate limits and making it identical with epigenesis?

J. P. McM.

Origin and Antiquity of Man. By G. FREDERICK WRIGHT, D.D., LL.D., F.G.S.A. Oberlin, Ohio, Bibliotheca Sacra Company. 1912. Pp. xx + 547. Illustrated.

As an introduction Professor Wright discusses the origin and antiquity of the earth. He inclines toward a very moderate estimate of the length of geologic time and hence of the human period, which began when man became a tool-user. To him the ancient civilizations of Babylonia, Egypt, Crete and Central Asia were of a high order. These rare blossoms in the springtime of history were each nurtured by exceptional geniuses instead of being the product of a gradual unfolding.

The diversity of languages is invoked as an aid in the measurement of man's antiquity. In view of the rapidity with which children when isolated invent a language of their own, the author believes the evidence of an extremely great antiquity of the human race drawn from the diversity of language at the dawn of history to be far from conclusive.

In the chapter on the "Origin of the Races of Europe" (p. 105), the author states that

the stone implements of the Scandinavian shell heaps "have usually been polished and sharpened by rubbing; this justifying their assignment to the 'smooth stone age.'" The fact is, artifacts of polished stone characterize a later stage and not the early shell-heap phase of the neolithic. Neither do the "chipped flint daggers of exquisite form" and the perforated diorite axes (pp. 125-126) come from the "kitchen middens," but from the stone cist burials of a later epoch. The statements that the Cro-Magnon race is of neolithic age (p. 115) and that it did not appear until after the mammoth had become extinct (p. 116) would not be admitted by the best authorities. Cro-Magnon is paleolithic and the mammoth lived on until the close of the Magdalenian, as attested by the mural art of the caverns, especially at Font-de-Gaume; and hence was a contemporary of the Cro-Magnon race. In the same paragraph by inference one is led to suppose that the engraved figure of a reindeer from Thayngen is the work of a neolithic craftsman; when on the contrary it is paleolithic.

As might be expected of Professor Wright, much space is devoted to man and the Glacial period, not only in the old world, but also in the new. His estimates of the length of time that has elapsed since the beginning of the Glacial period are moderate. He believes that the Glacial period was practically a unit, there being four phases instead of four distinct epochs, thus differing from some of the most noted living glacialists. The cause of the Glacial period is assigned to land elevation and its disappearance to a subsidence, factors which probably played a rôle in the great climatic drama, but which might have been correlated with other factors such as the changing condition of the sun itself and in the atmosphere.

But little space is given to cultural and somatic evolution, in which field many important results have recently been achieved. The Magdalenian polychrome frescoes on the cavern ceiling at Altamira are referred to as of Aurignacian age, an error into which Sollas ("Ancient Hunters") also fell.

The author's point of view might possibly be best reflected in a few quotations: "Our earliest knowledge of man is of a being fully formed and in possession of all the faculties of his kind" (p. 389). "On the important question of man's first arrival on this planet we may for the present possess our minds in peace, not a trace of unquestionable evidence of his existence having been found in strata admittedly older than the Pleistocene" (pp. 341-2). "The simple arithmetical calculations made above show that when once started, the dispersion over the world, the diversification of the races, the differentiation of languages, and the development of ancient civilization may easily have come about in the course of four or five thousand years, if not in half that time, and that the extension of prehistoric time for eight thousand years affords superabundant opportunity for the growth and development of all the peculiarities and institutions of man as first made known to us at the dawn of history" (p. 493). "The antiquity of man therefore so far as the question depends upon his connection with the Glacial epoch, is not proved to be, even when we allow a generous margin, greater than twelve or fifteen thousand years" (p. 494).

The chapter preceding the "Summary and Conclusion" treats of "The Biblical Scheme." The work has the welcome merit of an engaging style, possessing to a degree the charm of the author's personality. Another attractive feature is the "Appendix" of copious notes and references.

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SPECIAL ARTICLES

NEW AND EXTINCT BIRDS AND OTHER SPECIES FROM THE PLEISTOCENE OF OREGON

MANY years ago I published in the *Journal* of the Academy of Sciences of Philadelphia an account of the fauna of the Oregon desert region during Pleistocene time. This account was based upon a large collection of fossils sent me for the purpose by the late Professor E. D. Cope, who, with his assistants and a